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Inflation expectations and the outlook for services prices

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Abstract

Inflation is temporarily low mainly due to goods price shocks, but it could be permanently lower if services inflation moderates. We show that services prices respond to inflation expectations, which are in turn shaped by historical inflation outcomes. Given these relationships, we project inflation expectations and services inflation over the medium term. We also consider scenarios for reducing inflation expectations to the 4.5% target midpoint.

Introduction[1]

For central bankers, goods inflation may be fun to date, but services inflation is the one to marry. Goods price inflation is volatile, changing with each new shock. Services inflation, by contrast, is more stable, overlooking temporary factors and keeping an eye on the future. This makes it an attractive partner for monetary policy.

In South Africa, services inflation has recently slowed to around 5% – the average for the first quarter of 2018 was 5% exactly – after an extended period of stability close to 6%. It is not yet clear whether this slowdown is a blip or something more permanent. It is clearer, however, that the future trajectory of services prices will determine whether South African inflation can be anchored closer to the middle of the 3-6% target range. It is therefore important to understand services inflation and its drivers.

In this note we show that services inflation is closely connected to inflation expectations, and expectations are in turn responsive to headline outcomes. As such, a temporary shock to goods prices can engender permanently lower headline inflation, via an expectations channel which feeds into services prices. Although this suggests expectations are substantially backward-looking, it also means they have future effects – contrary to some simplistic accounts which dismiss inflation expectations as meaningless for future inflation.[2]

We provide a model incorporating these relationships, calibrated on data from the entire inflation targeting period. Our model indicates that, based on current headline projections, inflation expectations are likely to reach 5.1% by 2020 for both the current year and the two year ahead measure. Services inflation should then settle at this level, below its post-crisis average rate of 5.8%. We also consider a scenario in which headline inflation permanently settles at 4.5%. In this case, 2-year ahead expectations decline below 5% within 3 quarters, and stabilise at 4.5% after 11 quarters.

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[2]   See, for instance, Brian Kantor, "SARB must ignore inflation expectations, can't influence rand", https://www.fin24.com/BizNews/Brian-Kantor-SARB-must-ignore-inflation-expectations-cant-influence-Rand-20151104, 4 November 2015.

Comparing goods and services inflation

Goods and services prices behave differently. Over the post-crisis period, South African goods inflation has been volatile in the face of large shocks, including the oil price collapse of 2014/15, the exchange rate appreciations of 2010 and 2017, and the 2015/2016 combination of drought and rand weakness. By contrast, services inflation has been strikingly stable (Figure 1). To quantify the difference, goods price inflation has fluctuated between 1.6% and 8.0% since 2010, with a standard deviation of 1.6pp – whereas services inflation has moved in a range of 4.5% to 7%, with a standard deviation of just 0.5pp. The stability of services prices has been welcome, because it has contributed to inflation remaining close to the target range despite shocks. However, the persistently high level of service price inflation explains why headline inflation has remained relatively high throughout the post-crisis period.

y/y, January 2010 - February 2018	Average	Standard Deviation	Peak	Trough
Goods *(48.7)*	5.0	1.6	8.0	1.6
Services *(51.3)*	5.8	0.5	7.0	4.5
Total *(100.0)*	**5.3**	**0.9**	**7.0**	**3.0**

Figure 1: Goods and services inflation
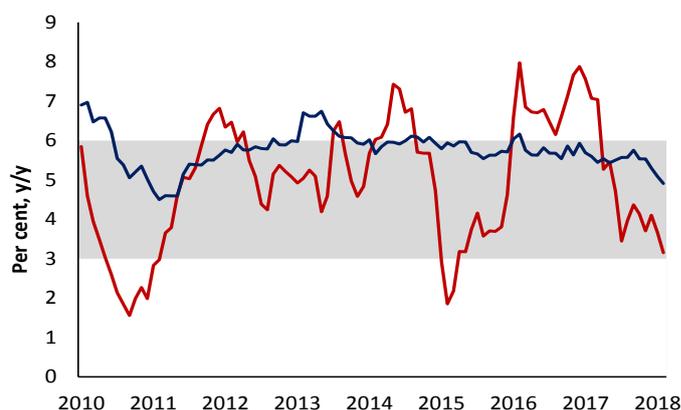

Explaining services inflation

Within the services inflation basket, there are many different categories, each with their own idiosyncratic characteristics. For instance, there are interesting stories to be told about owners' equivalent rent (Western Cape water crisis?), education (#feesmustfall?) or medical insurance (fraud?). However, while taking a magnifying glass to services prices can be both interesting and useful, it is not necessarily the best way to understand their aggregate dynamics. The micro approach carries with it risks of overlooking broader trends (the proverbial problem of overlooking the forest for the trees). Furthermore, by focusing so narrowly on real economy effects, this approach implicitly downplays the significance of monetary policy. The Reserve Bank has no influence over problems like Cape water shortages or medical insurance fraud; if services price dynamics are reduced to such factors, the responsibility of monetary policy is obscure.

There is, however, a much simpler way to tell the story of services prices. By this account, services inflation follows longer-term inflation expectations, and inflation expectations reflect the central bank's inflation target. The headline numbers are also consistent with this theory. Specifically, since the beginning of 2008 the correlation between two year ahead inflation expectations with services inflation has been almost

90%.[3] (Figure 2) Two-year ahead expectations have also been consistent with estimates of the SARB's de facto inflation target, having averaged close to 6% over the post-crisis period.[4]

For economists, there are really no surprises in a central bank having an inflation target, inflation expectations anchoring on that target and inflation behaving accordingly, with purely temporary interruptions due exogenous shocks. Indeed, this is exactly how monetary policy under inflation targeting is meant to work. Still, it is possible to write some extra characters into the story, such as the output gap, the exchange rate or unit labour costs. Their contribution to the storyline is limited, however, and often distracting. For instance, the exchange rate has moved by large amounts even as service price inflation has flat-lined. Similarly, the output gap has been consistently negative throughout the post-crisis period, without causing a sustained moderation in services prices. (Of course, output gap estimates are so uncertain that it is hard to tell any story about them.) In general, while other factors surely have roles to play in the story of services inflation, these are probably minor parts. Inflation expectations have the lead.

Figure 2: Relationship between services inflation and expectations, the exchange rate, the output gap and unit labour costs


Inflation expectations

The literature on South African inflation expectations consists largely of two claims. The first is that expectations in South Africa are backward looking. The second is that expectations are anchored at around 6%, the top of the Bank's target range.[5] Unfortunately, there is some tension between these claims: if expectations were indeed backward looking, then they would move around in line with actual inflation and not be anchored. We suspect a more reasonable interpretation would entail the following:

- Expectations are sticky. This means they can move through shocks without shifting much (since 2010 expectations have had a standard deviation of 0.26), which is how they responded to both lower inflation in 2015 (from the oil price collapse) and higher inflation in 2016 (drought and exchange rate depreciation). To say they are simply backward looking understates their persistence.

- Nonetheless, expectations can change. Although they have been quite stable at around 6% for most of the post-crisis period, they have also moderated recently. This likely reflects a mix of better inflation outcomes, an improved economic outlook and clearer monetary policy communication. Regardless of the explanation, however, it seems clear that expectations can move, under the right circumstances.

These two properties of inflation expectations make them very useful for monetary policy. Consider the alternatives: if expectations were more flexible, then they would not offer much protection against shocks; if they were less flexible, they would be exceedingly hard to shape. As it is, expectations provide a way to control inflation over time.

Figure 3: Headline CPI and inflation expectations
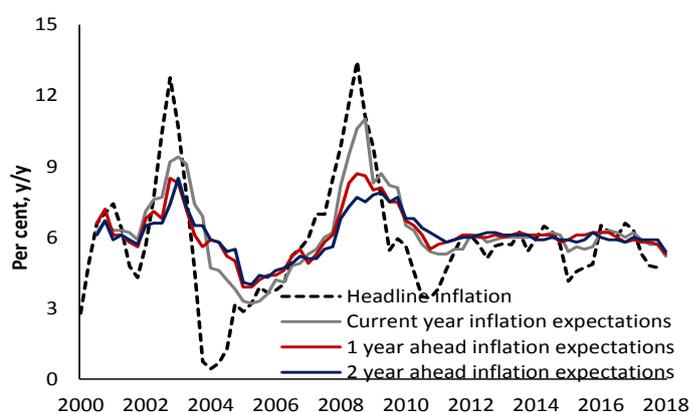
Modelling inflation expectations and services

To model services inflation, we econometrically estimate an equation based on past services inflation (lagged dependent) as well as two year ahead inflation expectations.[6] We also incorporate smaller roles for current and one year ahead expectations, given evidence that they have statistically significant effects under

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[5] See, for instance, Ehlers, N and du Plessis, S. 2018. "Inflation expectations behaviour in South Africa: bias and informational inefficiencies". *SARB Discussion Paper Series DP/18/01* and Kabundi, A and Schaling, E. 2013. "Inflation and Inflation Expectations in South Africa: an Attempt at Explanation". *South African Journal of Economics September 2013*.

[6] Our method is similar to one used to model US services inflation. See Richard Peach et al. "The Parts are More Than the Whole: Separating Goods and Services to Predict Core Inflation" https://www.newyorkfed.org/medialibrary/media/research/current_issues/ci19-7.pdf, 2013

certain circumstances.[7] Our data are drawn from the BER survey, for which the first data point is September 2000, shortly after the introduction of inflation targeting.

Our estimated inflation expectations equations are provided in Appendix A. Based on the SARB's current headline inflation forecasts (prepared for the March 2018 MPC), the model suggests that inflation expectations are likely to reach 5.1% by 2020, for the current year as well as the one and two year ahead measures (Figure 4). This permits services inflation to decline to similar levels – well below its post-crisis average rate of 5.8%. Of course, this assumes headline inflation is not hit by new exogenous shocks. This is unusually important because the anchor for expectations is being shifted by lower inflation. If inflation is actually higher, expectations would revert to their old levels.

Figure 4: Inflation expectations outlook based on current inflation forecasts
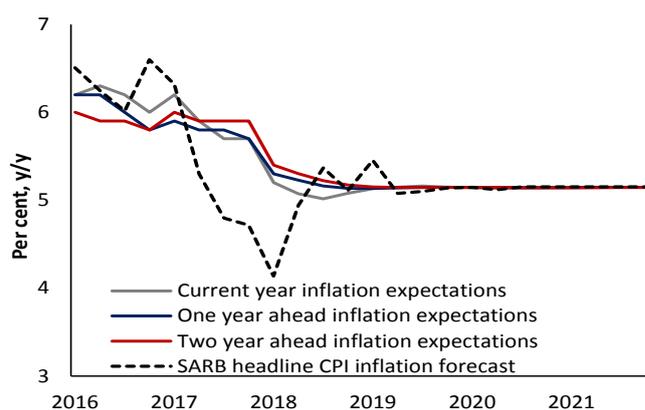
How long would it take to get expectations down to 4.5%?

In recent years, the SARB has been clear that the 3–6% target should not be interpreted as a 6% target, and that policymakers would prefer to have inflation expectations anchored to the 4.5% midpoint of that range. In terms of the methodology described above, this would require a period of CPI headline inflation at 4.5%, during which time price and wage setters would learn what inflation rates to expect in future.

In a scenario where headline inflation is fixed at 4.5%, the model indicates current year expectations would reach 4.5% within six quarters. One-year ahead expectations would converge on 4.5% within 10 quarters, and two-year ahead expectations would get there in around 11 quarters (Figure 5). The adjustment to the latter is not linear, however, with the convergence on 4.5% following an asymptotic trend. This means the last stage of the adjustment is more incremental than the first part. Accordingly, one-year and two-year ahead expectations would be under 5% within two and three quarters, respectively, and at 4.6% in about eight quarters.

These estimates require two further caveats. First, they assume expectations are formed in an environment where agents' only information about the central bank's target is that it is 3 − 6% (as it has been since 2000). Simply put, we are calibrating our model on history, and during this history agents had to guess at the Bank's exact target. However, the bank has recently begun to communicate its target more clearly, with an emphasis on the 4.5% midpoint, and this clarity could help speed up the adjustment process. We are certainly open to the possibility that expectations could become more forward looking, and that better

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[7] We tried different modelling strategies and found that two-year expectations affect services prices less in cases where shorter-term expectations are lower. This effect is not statistically significant the other way around, where shorter-term expectations are higher than the two-year measure. See equations in Appendix A.

central bank communication has a role to play in this, but we have not explicitly modelled this benign scenario.

Second, surveyed expectations also need not fasten exactly at 4.5% for expectations to be adequately anchored. Surveys rarely indicate expectations precisely at target, even in countries where expectations seem to be well controlled. In the United States, for instance, the much-cited Michigan survey of consumer expectations hardly ever indicates that expectations are at 2% (it has, for example, been above that point throughout the current decade, despite unusually low inflation rates). The real test for monetary policy will be whether actual inflation is in line with the midpoint, and especially if services inflation is fluctuating around this point. This will only be possible with lower expectations, if the thesis of this note is correct. Nonetheless, we would not be surprised if expectations keep coming in slightly above actual inflation, even as both moderate.

Figure 5: Inflation expectations under a 4.5% inflation scenario
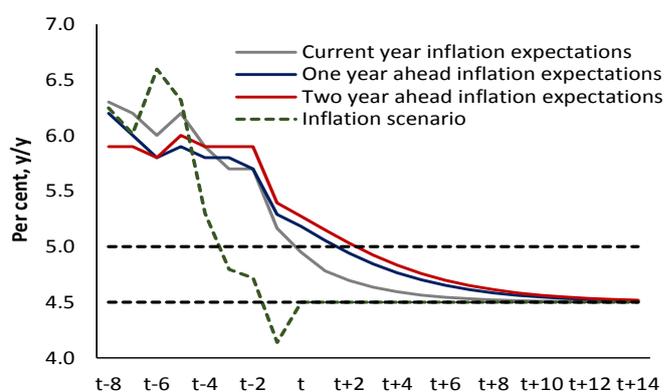
Conclusion

South African inflation has slowed, but more because of prices for goods than those for services. However, as inflation expectations adjust to lower inflation, services inflation is likely to stay lower than before. In this note, we provided evidence that services inflation will stabilise at around 5%. We also present scenarios in which expectations moderate further, bringing overall inflation closer to the midpoint of the target range. Our broader point is that services inflation, unlike goods inflation, is both relatively stable and responsive to something monetary policy can control, which is inflation expectations. This puts it at the heart of successful inflation targeting.

Annexure A

Current year inflation expectations

Dependent Variable: INFLEC
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 04/16/18   Time: 09:29
Sample: 2001Q1 2017Q4
Included observations: 68
INFLEC = C(1)*INFLEC(-1) +(1-C(1))*@MOVAV(PPCPI(1),4) +C(5) * DUM09Q1

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.690779	0.032501	21.25405	0.0000
C(5)	-2.543611	0.412496	-6.166390	0.0000

R-squared	0.936782	Mean dependent var	6.200000
Adjusted R-squared	0.935825	S.D. dependent var	1.627011
S.E. of regression	0.412168	Akaike info criterion	1.094200
Sum squared resid	11.21226	Schwarz criterion	1.159480
Log likelihood	-35.20281	Hannan-Quinn criter.	1.120066
Durbin-Watson stat	2.040406		

One year ahead inflation expectations

Dependent Variable: INFLE1
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 04/16/18   Time: 09:29
Sample: 2001Q1 2017Q4
Included observations: 68
INFLE1 = C(1)*INFLE1(-1) +(1-C(1))*INFLEC(0)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.682917	0.059012	11.57245	0.0000

R-squared	0.840841	Mean dependent var	6.126471
Adjusted R-squared	0.840841	S.D. dependent var	1.046475
S.E. of regression	0.417489	Akaike info criterion	1.105479
Sum squared resid	11.67789	Schwarz criterion	1.138119
Log likelihood	-36.58628	Hannan-Quinn criter.	1.118412
Durbin-Watson stat	1.336655		

Two year ahead inflation expectations

Dependent Variable: INFLE2
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 04/16/18   Time: 09:29
Sample: 2001Q1 2017Q4
Included observations: 68
INFLE2 = C(1)*INFLE2(-1) +(1-C(1))*INFLE1

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.432735	0.043732	9.895187	0.0000

R-squared	0.936089	Mean dependent var	6.079412
Adjusted R-squared	0.936089	S.D. dependent var	0.894854
S.E. of regression	0.226225	Akaike info criterion	-0.119972
Sum squared resid	3.428924	Schwarz criterion	-0.087333
Log likelihood	5.079063	Hannan-Quinn criter.	-0.107040
Durbin-Watson stat	2.324675		

CPI services inflation

Dependent Variable: @PCY(PSTOT)
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 04/16/18   Time: 09:29
Sample: 2008Q1 2017Q4
Included observations: 40
@PCY(PSTOT) =C(1)*@PCY(PSTOT(-1)) +(1-C(1))*INFLE2 +C(3)
    ((INFLE2-INFLE1)+@ABS((INFLE2-INFLE1))) +C(4)((INFLE1
    -INFLEC)+@ABS((INFLE1-INFLEC))) +C(33)*((INFLE2-INFLE1)
    -@ABS((INFLE2-INFLE1))) +C(44)*((INFLE1-INFLEC)-@ABS((INFLE1
    -INFLEC)))

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.331193	0.113462	2.918992	0.0061
C(3)	-0.646375	0.163758	-3.947146	0.0004
C(4)	-0.307427	0.102501	-2.999257	0.0050
C(33)	-0.174673	0.166774	-1.047361	0.3021
C(44)	0.110450	0.088535	1.247529	0.2205

R-squared	0.904929	Mean dependent var		6.142872
Adjusted R-squared	0.894064	S.D. dependent var		0.877768
S.E. of regression	0.285695	Akaike info criterion		0.448684
Sum squared resid	2.856755	Schwarz criterion		0.659794
Log likelihood	-3.973683	Hannan-Quinn criter.		0.525015
Durbin-Watson stat	2.053820			

* The coefficient on C(3) *[C(4)]* accounts for the asymmetric over estimation effect that two year *[one year]* ahead expectations may have on predicting services inflation when they are higher than one year *[current year]* expectations. For completeness we asymmetrically tested the impact if two year *[one year]* expectations were lower than one year *[current year]* expectations. These effects are captured by C(33) and *C(44)* and are shown to be insignificant.

Where:

INFLEC	=	BER current year inflation expectations
INFLE1	=	BER one year ahead inflation expectations
INFLE2	=	BER two year ahead inflation expectations
PSTOT	=	CPI : Total services
DUM09Q1	=	Dummy, 2009q1=1, zero otherwise
PPCIP	=	CPI : Headline

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